

REMARKS

The above amendments and these remarks are responsive to the Office Action issued on December 22, 2004. By this response, claims 1-6 and 8 and the specification are amended. Copies of a substitute specification in both clean form and mark-up form are attached hereto. No new matter is added. Claims 1-10 are now active for examination.

The Office Action

The Office Action rejected claims 1-10 under 35 U.S.C. §112, first paragraph for being directed to inventions that lack enabling description. Claim 1 was rejected under 35 U.S.C. §102(b) as being anticipated by Krivanek (U.S. Patent No. 4,743,756). The Office Action rejected claims 2-10 under 35 U.S.C. §102(e) as being anticipated by Taniguchi et al. (U.S. Publication No. 2004/0000641). The specification was objected to for grammatical errors and usage of technical terms.

Applicants submit that the rejections are overcome and the objection is addressed in view of the amendments and remarks presented herein.

The Substitute Specification

The Office Action objected to the specification for usage of English and technical terms. By this Response, the specification is amended to improve wording. Per the Examiner's request, a clean copy of a substitute specification is submitted. A mark-up copy showing changes made is also attached. Applicants submit that the substitute specification contains no new matter. It is believed that the specification is now in proper form.

The Rejection under 35 U.S.C. §112 Is Overcome

Claims 1-10 were rejected under 35 U.S.C. §112, first paragraph for being directed to inventions that lack enabling description. Specifically, the Office Action identified several terms in the claims and asserted that they are purportedly inconsistent to normally accepted usage. The Examiner provided various suggested changes to the identified terms.

By this Response, claims 1-10 are amended as suggested by the Examiner, except for “electron beam generator” and “element distribution states,” because their respective meanings are clear and widely accepted. For instance, “electron beam generator” is a widely accepted term meaning a generator for producing electron beams, which could be an electron beam gun or source, as suggested by the Examiner. The meaning of the term “element distribution states” in claim 1 is also clear. As the term suggests on its face, “element distribution states” means states of element distribution or chemical compositions. Claim 1 describes an electron microscope for measuring electron beam energy loss spectra or observing element distribution states by analyzing the energy of an electron beam. The specification provides sufficient support to the feature by describing examples of images of element distributions. For example, exemplary element distribution images of oxygen are described in Figs. 5A-5C and page 24, line 4 through page 25, line 2 of the written description.

Applicants submit that the claims as amended are now in proper form for examination.

The Anticipation Rejection of Claim 1 Is Overcome

The Office Action rejected claim 1 as being anticipated by Krivanek. The anticipation rejection is respectfully traversed because Krivanek cannot support a prima facie case of anticipation.

Claim 1 describes an electron microscope with specific characteristics for measuring electron beam energy loss spectra or observing element distribution states by analyzing the energy of an electron beam. Specifically, the paths of electron beams are controlled such that the energy deviation between two electronic beams with different spatial characteristics relative to an optical axis is limited to a specific range. According to claim 1, the energy deviation in the electron beam energy loss spectrum is less than 1 eV between (1) an electron beam irradiated on a sample surface at a position no more than 13 micrometers shifted away from the optical axis of the electron microscope, and (2) that of an electron beam irradiated on the sample surface along the optical axis of the electron microscope.

On the other hand, Krivanek describes a parallel-detection electron energy-loss spectrometer in which the dispersion of the electron energy spectrum can be varied as desired. In rejecting claim 1, the Office Action merely replicated the claim language and asserted that Krivanek teaches every limitation of claim 1 in col. 1, lns. 14-23; col. 3, lns 51-68; and col. 4, lns. 5-22. Applicants respectfully disagree.

Although the paragraphs identified by the Office Action recite the number “1 eV,” the recitation merely describes that the spectrometer in Krivanek is configured to magnify the dispersed spectrum and project it onto parallel detector 50, such that the spatial separation in the spectrum between two beams of energies differing by 1eV can be varied typically from 10 micrometers to 10 millimeters per eV. In other words, the paragraphs merely describe the range of spatial separation of two beams with different energies. There is no specific teaching regarding the directions of electron beams being irradiated on a sample, that is, either along the optical axis of the microscope or at a position no more than 13 micrometers shifted from the optical axis, and their respective relationships to energy-loss spectrum, as described in claim 1.

Since Krivanek fails to teach every limitation of claim 1, Krivanek cannot support a prima facie case of anticipation. The anticipation rejection is untenable and should be withdrawn. Favorable reconsideration of claim 1 is respectfully requested.

The Anticipation Rejection of Claims 2-10 Is Overcome

Claims 2-10 were rejected as being anticipated by Taniguchi. The anticipation rejection is respectfully traversed because Taniguchi fails to disclose every limitation of claims 2-10.

(1) Claims 2, 3 and 5-10

Independent claim 2, as amended, describes an electron microscope including energy dispersion means, such as an energy filter, for analyzing the energy of an electron beam. The microscope further includes electron beam directing means, disposed on the upstream side of the energy dispersion means, for directing the electron beam to the energy dispersion means; and path correction means for correcting the path of the electron beam exiting from the energy dispersion means in the energy-axis direction of an energy dispersion plane formed by the energy dispersion means. In other words, the electron beam directing means and path correction means are provided at two different positions relative to the energy dispersion means to correct deviations of electronic beams before and after the electronic beams passing the energy dispersion means.

In contrast, Taniguchi describes a scanning transmission electron microscope having a deflector coil disposed at the upstream side of an energy filter 21 for modifying the path of an electron beam before it reaches a sample. However, Taniguchi does **not** teach or disclose that electron beam directing means and path correction means, such as deflector coils, should be provided at two different positions relative to the energy dispersion means to correct deviations

of electronic beams **both** before and after the electronic beams passing the energy dispersion means, as described in claim 2. Since Taniguchi fails to disclose every limitation of claim 2, Taniguchi cannot support a prima facie case of anticipation. Consequently, the anticipation rejection of claim 2 is untenable and should be withdrawn. Favorable reconsideration of claim 2 is respectfully requested.

Claims 3 and 5-10, directly or indirectly, depend on claim 2 and incorporate every limitation thereof. Accordingly, claims 3 and 5-10 are also patentable over Taniguchi for at least the same reasons as for claim 2 by virtue of their dependencies. Favorable reconsideration of claims 3 and 5-10 is respectfully requested.

(2) Claim 4

Claim 4 describes an electron microscope including an energy dispersion means for analyzing the energy of an electron beam. Deflection coils are respectively disposed on the upstream and downstream sides of the energy dispersion means. The deflection coil disposed on the upstream side of the energy dispersion means corrects the path of the electron beam in two directions along perpendicular axes in a plane normal to the optical axis of the energy dispersion means, or in a two-dimensional way. The deflection coil disposed on the downstream side of the energy dispersion means corrects the path of the electron beam in a plane normal to the optical axis of the energy dispersion means so that at least one of the directions in which the path of the electron beam is corrected coincides with the energy axis of an energy dispersion plane formed by the energy dispersion means. Accordingly, two stages of deflection coils are provided at two different positions relative to the energy dispersion means to correct the path of an electronic beam before and after it passes the energy dispersion means.

As discussed earlier relative to claim 2, Taniguchi merely describes using a deflector coil to modify the path of an electron beam on the upstream side of an energy filter 21. However, Taniguchi does **not** teach or disclose using two stages of deflection coils disposed at two different positions relative to the energy dispersion means, so that at least one of the directions in which the path of the electron beam is corrected coincides with the energy axis of an energy dispersion plane formed by the energy dispersion means, as describe din claim 4. Furthermore, Taniguchi **fails** to specifically teach that the deflection coil disposed on the upstream side of the energy dispersion means corrects the path of the electron beam in two directions along perpendicular axes in a plane normal to the optical axis of the energy dispersion means, or in a two-dimensional way. Taniguchi also fails to disclose that the deflection coil disposed on the downstream side of the energy dispersion means corrects the path of the electron beam in a plane normal to the optical axis of the energy dispersion means, as described in claim 4. Accordingly, claim 4 is patentable over Taniguchi. Favorable reconsideration of Taniguchi is respectfully requested.

Conclusion

For the reasons given above, Applicants believe that this application is conditioned for allowance and Applicants request that the Examiner give the application favorable consideration and permit it to issue as a patent. However, if the Examiner believes that the application can be put in even better condition for allowance, the Examiner is invited to contact Applicants' representatives listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

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including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP

A handwritten signature in black ink that reads "Wei-Chen Chen". The signature is written in a cursive, flowing style.

Wei-Chen Nicholas Chen

Recognized under 37 CFR §10.9(b)

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000
Facsimile: 202.756.8087
Date: March 21, 2005

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as our correspondence address.**